

632 1. A flexible, hollow waveguide for transmitting radiation
633 in visible and IR regions, comprising:
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635 (a) a hollow, flexible tube having a transparent annular
636 body defining a bore with a smooth inner bore surface;
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638 (b) a metal layer disposed upon the smooth inner bore
639 surface; and
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641 (c) a composite of dielectric, sulfide-containing
642 materials having a high refractive index ratio, said
643 sulfide-containing materials disposed upon said
644 reflective layer and forming a photonic, bandgap tube
645 transmitting in the visible and IR regions.
646

647 2. The waveguide in accordance with claim 1, wherein said
648 hollow, flexible tube is composed of glass.
649

650 3. The waveguide in accordance with claim 1, wherein said
651 hollow, flexible glass tube is composed of silica-glass.
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654 4. The waveguide in accordance with claim 1, wherein said
655 composite of dielectric, sulfide-containing materials comprise
656 disparate refractive indices of approximately 2 : 1.

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658 5. The waveguide in accordance with claim 4, wherein said
659 metallic layer is selected from a group of metals consisting
660 of: Ag, Au, Cu, Pt, Ni, Mb, Al, and combinations thereof.

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662 6. The waveguide in accordance with claim 1, further
663 comprising:

664
665 (d) an outer layer surrounding the hollow, flexible tube.

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667 7. The waveguide in accordance with claim 4, wherein the
668 composite of sulfide-containing materials respectively
669 comprise paired composite layers of cadmium and lead sulfide.

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671 8. The waveguide of claim 8, wherein said outer layer is
672 composed of a material selected from a group of materials
673 consisting of plastic, silicone.

677 9. A flexible, hollow waveguide, comprising:

678
679 (a) a flexible, hollow tube having a transparent
680 annular body defining a bore with a smooth inner
681 bore surface;

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683 (b) a metallic layer disposed upon the smooth inner
684 bore surface; and

685
686 (c) a composite of dielectric materials disposed upon
687 the metallic layer featuring disparate refractive
688 indices with a ratio of approximately 2 : 1.

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690 10. The waveguide in accordance with claim 9, wherein
691 said composite of dielectric materials respectively comprise
692 two sulfide layers.

693
694 11. The waveguide in accordance with claim 9, wherein
695 said metallic layer is selected from a group of metals
696 consisting of: Ag, Au, Cu, Pt, Ni, Mb, Al, and combinations
697 thereof.

699 10. The waveguide in accordance with claim 9, further
700 comprising:

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702 (d) an outer layer surrounding the hollow flexible tube.
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704 12. The waveguide in accordance with claim 9, wherein
705 the composite of dielectric materials form sulfide-containing
706 layers.
707

708 13. The waveguide in accordance with claim 9, wherein
709 the composite of dielectric materials respectively comprise
710 cadmium and lead sulfide.
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712 14. The waveguide in accordance with claim 11, wherein
713 said outer layer is selected from a group of materials
714 consisting of plastic, silicone.

715 15. A flexible, hollow waveguide for transmitting
716 radiation in visible and IR regions, comprising:
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718 (a) a hollow, flexible tube having a transparent annular
719 body defining a bore with a smooth inner bore surface;
720 and
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722 (b) a composite of dielectric, paired sulfide-containing
723 materials having a high refractive index ratio, said
724 sulfide-containing materials disposed upon said hollow
725 tube, and forming a photonic, bandgap tube
726 transmitting in the visible and IR regions.
727
728 16. The waveguide in accordance with claim 15, wherein
729 said hollow, flexible tube is composed of glass.
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731 17. The waveguide in accordance with claim 15, wherein
732 said hollow, flexible glass tube is composed of silica-glass.
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734 18. The waveguide in accordance with claim 15, wherein
735 said composite of dielectric, sulfide-containing materials
736 comprise disparate refractive indices of approximately 2 : 1.

737 19. The waveguide in accordance with claim 18, further
738 comprising:

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740 (d) an outer layer surrounding the hollow, flexible tube.
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742 20. The waveguide in accordance with claim 15, wherein the
743 composite of sulfide-containing materials respectively
744 comprise paired composite layers of cadmium and lead sulfide.
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746 21. The waveguide of claim 19, wherein said outer layer is
747 composed of a material selected from a group of materials
748 consisting of plastic, silicone.
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750 22. A flexible, hollow waveguide, comprising:
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752 (a) a flexible, hollow tube having a transparent
753 annular body defining a bore with a smooth inner
754 bore surface;
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756 (b) a composite of dielectric materials disposed upon
757 the smooth inner bore surface of said transparent
758 annular body, featuring disparate refractive indices
759 with a ratio of approximately 2 : 1.

760 23. The waveguide in accordance with claim 22, wherein
761 said composite of dielectric materials respectively
762 comprise two sulfide layers.

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765 24. The waveguide in accordance with claim 22, further
766 comprising:

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768 (d) an outer layer surrounding the hollow flexible tube.
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770 25. The waveguide in accordance with claim 22, wherein the
771 composite of dielectric materials respectively comprise
772 cadmium and lead sulfide.

773
774 26. The waveguide in accordance with claim 24, wherein said
775 outer layer is selected from a group of materials consisting
776 of plastic, silicone.

783 27. A method of fabricating a flexible, hollow waveguide
784 using liquid phase deposition, comprising the steps of:
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786 (a) Depositing a metallic layer on a smooth, inner bore
787 surface of a hollow, flexible, silica-glass tube;
788 and
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790 (b) depositing at least one layer containing a sulfide
791 upon said metallic layer of step (a).
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793 28. The method in accordance with claim 27, wherein two
794 sulfide-containing layers, cadmium sulfide and lead
795 sulfide, respectively, are deposited upon said metallic
796 layer.
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798 29. The method in accordance with claim 27, wherein a
799 cadmium sulfide layer is deposited upon said metallic
800 layer in accordance with step (b).
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806 30. A method of fabricating a flexible, hollow waveguide
807 using liquid phase deposition, comprising the steps of:

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809 (a) depositing at first layer of cadmium sulfide upon
810 an inner, smooth bore surface of a hollow silica-
811 glass tube; and

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813 (b) depositing at least a second layer of lead sulfide
814 over said first layer of cadmium sulfide.

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816 31. The method in accordance with claim 30, wherein multiple
817 sulfide-containing layers of cadmium sulfide and lead
818 sulfide, respectively, are stack deposited upon said
819 inner, smooth bore of said hollow tube.

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